1998 Annual Report

Pesticide Incident Reporting and Tracking Review Panel

September 1999

Environmental Health Programs

1998 Annual Report

Pesticide Incident Reporting and Tracking Review Panel

A report to the legislature as required by
Chapter 380, Laws of 1989, and RCW 70.104

September 1999

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EXECUTIVE SUMMARY

The 1998 report is the Pesticide Incident Reporting and Tracking (PIRT) Review Panel's ninth annual report. The PIRT Review Panel consists of the Washington State Departments of Agriculture (WSDA), Ecology, Health (DOH), Labor and Industries (L&I), Natural Resources (DNR), Fish and Wildlife (WDFW), as well as the University of Washington (UW), Washington State University (WSU), Washington Poison Center (WPC), a practicing toxicologist, and a member of the public.

The PIRT Panel is directed by statute (RCW 70:104.090) and has among its responsibilities the identification of inadequacies in pesticide regulations that result in insufficient protection of public health and the approval of an annual report summarizing pesticide incidents. This PIRT report presents and evaluates pesticide incidents reported in 1997 from four state agencies: Agriculture, Ecology, Health, and Labor and Industries, and the Washington Poison Center. It also describes PIRT 1998 panel activities. This is the complete report to the legislative summary published by DOH in December 1998.

Actions on 1997 Recommendations of the PIRT Panel

- Obtain environmental incident data from natural resource agencies for inclusion in the PIRT Annual Report.

  This report includes 1997 ecological incident data and a discussion of pesticide monitoring activities.

- Review the PIRT panel's statutory responsibilities to determine if activities and membership reflect current concerns and mandates.

  During 1998, the panel reviewed and revised the mission and goals. In September the panel decided to seek the Governor's appointment of two new panel members; a practicing toxicologist and a member of the public. The terms of the members currently in these positions expired in 1997.

- Enhance coordination of PIRT and the Pacific Northwest Agricultural Safety & Health Center, University of Washington.

  At the June meeting, Matt Keifer, MD, Pacific Northwest Agricultural Safety and Health Center, gave an overview of the many projects currently underway at the Center. Opportunities for information exchange and coordination were suggested. The Center will keep the panel informed of their activities.

- Complete the PIRT Legislative Summary so it is available during the legislative session.

  The 1998 PIRT Legislative Summary was distributed prior to the 1999 legislative session.

- Identify additional stakeholders who would benefit from information contained in the PIRT Annual Report.

  The 1997 PIRT Annual Report was published in June 1998. DOH issued a news release and made the report publicly available through the DOH Web Page.

- WSDA provide additional training and education to Wood Destroying Organisms (WDO) inspectors.

  In 1998, WSDA conducted many seminars and day long workshops for the WDO industry. These training activities included: participation in the WSU re-certification program; presentation of workshops on pest inspections; and collaboration with the Washington State Housing Finance Commission.

- DOH target educational efforts for safe use of pesticides in urban/suburban settings.

  DOH is collaborating with WSU Cooperative Extension Service to develop educational materials for pesticide users in urban and suburban settings.

- DOH monitor and evaluate reported incidents occurring in greenhouses and nurseries.

  In 1998, DOH reviewed the incident data from 1991 through 1997 for cases involving greenhouses and nurseries. DOH investigated 55 incidents at nurseries or greenhouses involving 59 individuals. Thirty (49%) were considered pesticide related cases. Twenty-three involved pesticide applications, mixing or loading, and 20 involved exposure to pesticide residues. The complaint most frequently experienced by the occupational group is eye irritation indicating a need for more consistent use of personal protective equipment. From 1995 through 1997 L&I conducted 10 investigations of nurseries or greenhouses, all in western Washington. Frequently found violations include lack of respirators, lack of respirator fit-testing or deficiencies in respirator maintenance.

- L&I identify reasons for the increase of rejected claims resulting from pesticide exposure.

  In 1998, L& I conducted a review of claims data since1994 to determine the reasons for an increase in rejected pesticide claims. The increase in rejected pesticide claims in 1994 (from 6% to 27%) was the result of a number of pesticide claims being processed by the newly formed Chemically Related Illness (CRI) unit in the Industrial Insurance Division. This group, formed in August 1994, includes an occupational nurse consultant, an occupational medicine physician, and claims managers trained in occupational diseases. The CRI unit began processing claims involving pesticide exposure in person rather than having it done by computer. Because most pesticide claims did not involve time-loss from work, they were previously computer-processed in a procedure known as “auto adjudication”. Computer processed claims did not look at such important elements as whether a pesticide was actually applied, an exposure actually occurred, objective findings of disease were present, or whether the treating physician had concluded the diagnosed condition was caused by exposure to pesticides. The number of rejected claims increased because the CRI unit could find no objective findings of disease or no evidence of an exposure occurring. The percentage of rejected pesticide claims increased to 50% in 1996, and then decreased to 43% in 1997. In July 1998, the CRI unit re-evaluated the criteria for claim acceptance and began accepting more pesticide claims that included documented exposure to pesticide in the absence of objective medical findings. Medical fees for the initial visit are paid for most rejected claims.

1997 DATA SUMMARY

In 1998, the PIRT Panel reviewed agency response times to pesticide-related complaints reported in 1997. Each agency has a different statutory mandate for response time. The PIRT Panel found agency response time to be satisfactory.

In 1997, WSDA received 204 pesticide complaints resulting in the finding of 110 violations. After investigation, 157 involved pesticide applications and 47 were complaints unrelated to pesticides. Drift and human exposure are the primary reason for pesticide related complaints. In 1997, following investigation 78 percent of all complaints were determined to have a low severity rating (Appendix D). The WSDA severity scale takes into account human exposure, environmental and economic damage and compliance with regulations. In 1997, more severe cases were reported than in 1996 and involved animal poisonings (primarily dogs) from strychnine, some human exposure cases where the individuals were taken to hospital emergency rooms following pesticide exposure and incidents involving bee kills. Partially because of the data collected for the PIRT report, WSDA was able to show why strychnine should be reclassified as a State Restricted Use pesticide. Legislation was passed in 1998 removing strychnine from the Home & Garden market in Washington State.

DOH investigated 365 incidents involving 441 persons including 61 children under the age of 19 years. Over one-half (237) of these cases were determined to be definitely, probably or possibly related to pesticides. Four of the pesticide related cases were classified as severe. Forty-eight percent of health complaints received by DOH were associated with non-agricultural pesticide use. Agricultural tree fruit workers were the occupational group most frequently involved in pesticide incidents. Exposure to residues on foliage or in buildings and landscapes accounted for 35 percent of the occupational cases.

The Department of Labor and Industries received 235 claims relating to pesticide illness. Fifty-four percent of the pesticide related claims involved workers in the fruit industry. The Washington Industrial Safety and Health Act Services Division conducted 20 pesticide-related investigations with 18 findings of violation.

In 1997, Ecology investigated 49 complaints involving pesticide threats to air, water or soil. Thirty complaints came from eastern Washington and 19 from western Washington. Twenty-four complaints occurred in the agricultural environment, 16 in the commercial/industrial, and 9 resulted from residential activities.

The Washington Poison Center received 3,227 calls related to pesticide poisoning in 1997. This is two percent of the total calls received, and reflects no significant change from prior years. Insecticides continue to be the most frequent type of pesticide call to WPC, followed by herbicides and rodenticides. Forty-two percent of the calls involved individuals less than six years old.

The data continue to show that pesticide incidents can be reduced by:

- Careful preparation to determine the area is not occupied before making pesticide applications.

WSDA# 15C97 and DOH# 970117 *Three children were drifted on by an aerial applicator while waiting for a school bus.*

- Using better health and safety practices.

  DOH# 970274 *A fruit worker developed eye irritation after he accidentally wiped his eye with the sleeve of his shirt contaminated with insecticide residue from the previous day.*

- Wearing eye and face protection, and proper gloves, using water decontamination and changing clothes when garments are contaminated with pesticide.

- While agencies received fewer pesticide complaints in 1997 than in previous years, similar patterns of distribution and exposure were observed. Public concern as expressed by the number of calls received by the Washington Poison Center remain high (3,227 in 1997).

1998 Recommendations of the PIRT Review Panel

- Further develop the PIRT Panel goals and tasks.
  The panel will update their goals and tasks to reflect current issues. The revised goals and tasks will include the public's concerns related to pesticide exposure.

- Prepare a five year (1993 through 1997) analysis of PIRT incident data.
  The panel will evaluate incident data submitted by WSDA, DOH and L&I from 1993 through 1997 to identify trends for intervention strategies.

- Recommend L&I conduct a database search for additional pesticide claims based on ICD-9 (international Classification of Diseases 9th Revision) diagnoses and Z-16 (USA Standard Injury) codes.
  Currently pesticide claims are identified through computer scanning for specific words: words that end in "cide", spray and/or fumigate. In order to verify that this system detects all pesticide related claims, L&I will search claims by ICD-9 codes (assigned at the hospital) and by Z-16 codes (determined by L&I) pertaining to pesticide illness.

- Review PIRT data for pesticide active ingredients involved in incidents.
  The review will provide information on specific formulations of products involved in incidents and complaints. This will enhance WSDA's efforts to track pesticide active ingredients involved in incidents.

- Review a sample of pesticide labels involved in incidents to determine if instructions were adequate to have prevented the accident (misuse not withstanding).
  The intent of this review is to provide the EPA with information based on actual incidents for future recommendation for label change.

- Establish networking capability with other states having panels with similar missions or with similar reporting systems.

The panel will exchange information with other states and learn from their experiences.

- Review current pesticide monitoring efforts in urban surface waters.
  The panel would like to know what pesticide monitoring activities are currently underway and what pesticides are being monitored.

- Define PIRT's role in reducing the risk of pesticide exposure in the urban environment.
  The panel will begin by reviewing agency urban incident data to look for common routes and causes of pesticide exposure.

Introduction

RCW 70.104.090 (Appendix A) directs the PIRT Panel to centralize the receipt of information regarding pesticide complaint investigations. As mandated, this report describes PIRT activities for 1998 and evaluates 1997 pesticide incident data. The report has been reviewed and approved by PIRT.

Table 1 PIRT Panel Representatives

Department of Health (DOH):	Maryanne Guichard, Chairman
Department of Health (DOH):	Jane C. Lee, Coordinator
Department of Agriculture (WSDA):	Ann Wick
Department of Ecology (Ecology):	David Rountry
Department of Fish and Wildlife (WSFW):	Carl Samuelson
Department of Health (DOH):	Lynden Baum
Department of Labor and Industries (L&I):	Dan Locke
Department of Natural Resources (DNR):	Vacant
General Public:	Nick Heyer, Ph.D.
Practicing Toxicologist:	Gary Pascoe, Ph.D., DABT
University of Washington (UW):	Lucio G. Costa, Ph.D.
Washington Poison Center (WPC):	William O. Robertson, MD
Washington State University (WSU):	Allan Felsot, Ph.D.

1998 PIRT Activities

PIRT met six times in 1998 and addressed the following issues:

- Revised its mission and goals,
- How to obtain more environmental pesticide incident data,
- Distributing the 1997 report more widely and putting it out on the World Wide Web,
- Issued a legislative summary of the 1998 annual report prior to the 1999 legislative session,
- Reviewed L&I pesticide claims referrals to DOH; and
- Welcomed a new chair, new agency members, and began the search for two new Governor appointed members.

1997 Agency Summary Reports

Table 2 summarizes 1997 pesticide related incidents for each agency submitting data. Individual descriptions of pesticide incidents are found in Appendix D.

Total Number of Pesticide Complaints/Incidents

Each agency and WPC received general inquires and concerns from the public regarding pesticides. Unless these inquiries required investigation, they are not included in the *1998 PIRT Annual Report.* All pesticide related complaints are recorded and investigated by agencies in accordance with their statutory requirements (Appendix A).

In 1997, WSDA conducted 204 investigations, DOH 365, Ecology 49, L&I Washington Industrial Safety and Health Act (WISHA) 20, and L&I Claims Administration Program received 235 pesticide related worker compensation claims. Additionally, 3,227 pesticide related calls were received by WPC; 156 merited referral to DOH. Because of specific statutory responsibilities, incidents may be reported and investigated by more than one agency.

Response Times

RCW 70.104.080 specifically directs PIRT to monitor agency response time to pesticide related complaints. Response time is defined as the interval between initial receipt of a complaint and an agency's first response to that complaint. The first notification is usually by telephone, followed by a personal contact. In 1997, WSDA responded to 88 percent of reported complaints within 24 hours; DOH responded to 95 percent of reported incidents within 48 hours; and, L&I responded to 70 percent of complaints within 30 days. The three agencies have different mandates for response (Appendix A).

Table 2 1997 Agency Summaries of Pesticide Incidents

Washington State Department of Agriculture: 204 complaints.

Pesticide-Related Complaints	157
Violations	89
Complaints Unrelated to Pesticides	47
Violations	21

Enforcement Actions

■ Warning letters	16
■ Notice of correction/deficiency	64
■ Technical assistance/verbal warning	12
■ Administrative action	17
■	
■	

110 Violations by Type of Activity

■ Agriculture	40
■ Commercial/industrial	22
■ PCO/WDO	24
■ Residential (homeowner)	8
■ ROW/Public	10
■ Other (license/records)	6

Type of License Involved with Violations

■ Commercial	57
■ Private Applicator	15
■ Unlicensed	22
■ Public operator	10
■ Commercial consultant	3
■ Dealer	2
■ Private Commercial	1

Department of Health: 365 incidents involving 441 individual cases.

Type of Incident

■ Agriculture	183
■ Residential	91
■ Commercial/industrial	51
■ Other	40

61 Childhood Cases ≤ 18 years old

■ Definite, probable, or possible	24
■ All other classifications	37

Relationship to Exposure for 441 cases

■ Definite	36	■ Unrelated	42
■ Probable	78	■ Asymptomatic	28
■ Possible	100	■ Indirect	1
■ Unlikely	82	■ Unknown	74

214 Definite, Probable, or Possible Cases

■ Non agricultural	121
■ Agriculture	93

L&I: 20 Washington Industrial Safety and Health Act (WISHA) complaints

Inspections	20
■ Citations	18

Type of Business

■ Orchard	5
■ Golf course	1
■ Greenhouse/nursery	4
■ Other farms (e.g., berries, tree farms)	5
■ Other (e.g., grain terminal, landscape, tree service)	5

L&I: 235 worker compensation claims.

Agriculture	167
Non Agriculture	68

Benefits Paid

■ Rejected	101
■ Medical benefits paid	108
■ Time loss paid	14
■ Kept on salary	-
■ Pending	12
■ Unknown	-

Ecology: 49 pesticide complaints

Type of Incident

Threat to ground/surface water	10
Disposal/waste	10
Spills	8
Storage	3
Other (e.g., fire, fumigation)	18

Washington State Department of Agriculture

The Washington State Department of Agricultural (WSDA) investigated all reported complaints involving pesticide use, sales, distribution, pesticide licensing, and building structure inspections for Wood Destroying Organisms (WDO). During 1997, WSDA investigated 204 complaints (Table 3). After investigation, 157 involved pesticide applications and 47 were complaints unrelated to pesticides.

Eighty eight percent of all complaints were responded to within 24 hours. WSDA is required to respond to cases of human exposure within 24 hours of receipt. Other cases are responded to as soon as resources allow, generally within 2-3 days.

Over half (57%) of the complaints were reported to WSDA during a three month period from April to June corresponding to peak periods of applications. However, WSDA received 65 percent of complaints four or more days after the incident had occurred. For 21 incidents the complaint was reported more than six months after the event. Many of the cases with long response periods concerned WDO inspections where the complainant was not aware of an uncorrected problem. Long delays in reporting, especially drift complaints, make it difficult for WSDA to obtain environmental samples and accurate testimony.

Table 3 WSDA Complaints and Violations

Year	Total Complaints	Violations
1992	558	264 (47%)
1993	400	166 (42%)
1994	383	138 (36%)
1995	259	87 (34%)
1996	251	104 (41%)
1997	204	110 (54%)

Location

One hundred nineteen (58%) of the 1997 complaints occurred in eastern Washington; 85 (42%) were from western Washington (Figure 1). Table 4 lists the counties with the most complaints from 1993 through 1997.

1997 WSDA Complaints by County

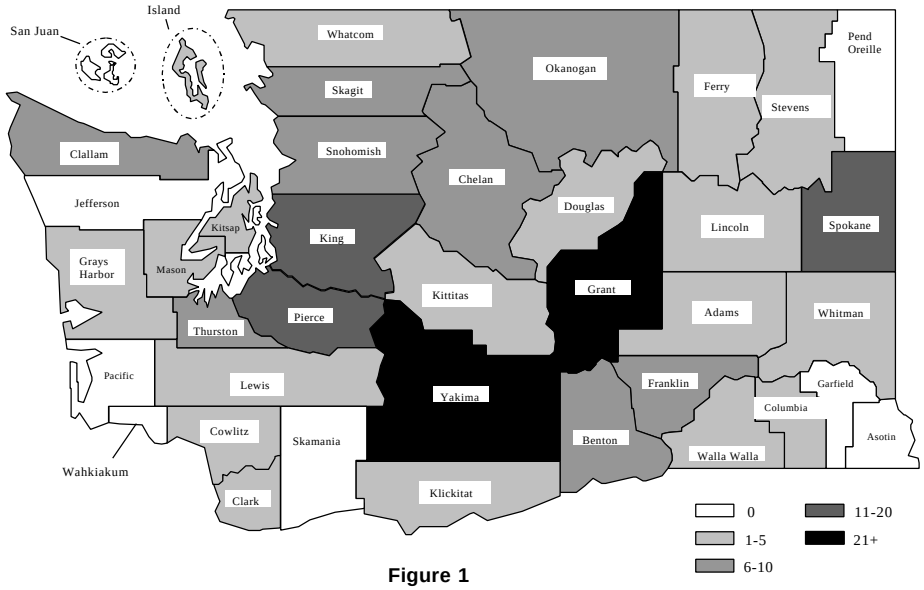

Figure 1

Table 4 WSDA Counties with the most complaints 1993-1997

1993	1994	1995	1996	1997
Benton 52	King 51	Spokane 37	Spokane 26	Grant 24
Yakima 45	Yakima 50	Yakima 27	King 25	Yakima 22
King 41	Pierce 28	King 19	Yakima 25	King 20
Grant 28	Franklin 24	Skagit 17	Grant 16	Spokane 18
Thurston 24	Walla Walla 23	Grant 16	Whatcom 14	Pierce 13
Spokane 17	Benton 19	Pierce 16	Pierce 13	Benton10
Clark 15	Thurston 18	Benton 14	Skagit 13	Skagit 9
Wall Walla 15	Grant 18	Snohomish 12	Clark 11	Snohomish 9
Chelan 15		Walla Walla 12	Benton 10	Okanogan 8

Type of Activity Involved in Complaint

Table 5 shows the type of activity for complaints resulting in violations from 1992 to 1997. It is interesting to note that while numbers of violations increased slightly in 1997, no trend or activity is apparent.

Table 5 1992-1997 WSDA Violations by Type of Activity

Activity	1992	1993	1994	1995	1996	1997
Agricultural	158	75	46	26	29	40
Commercial/Industrial	32	60	44	24	27	22
PCO/WDO*	*	*	28	28	20	5
WDO***						19
Residential (non commercial)	9	15	12	3	9	8
Right-of Way**	**	**	**	**	3	10
Other (licenses, records, etc.)	65	16	8	6	16	6
Total Violations	**264**	**166**	**138**	**87**	**104**	**110**

** Prior to 1994, PCO cases were classified as other and, and in 1996, Wood Destroying Organisms were included with Pest Control Operators.*
*** Prior to 1996, right-of-ways were included with commercial/industrial.*
****In 1997, PCO and WDO are listed separately*

The following WSDA definitions apply to type of complaint.

- **Agricultural:** Incidents occur in an agricultural environment such as farming, forestry, greenhouses, or Christmas tree farming.
- **Commercial/industrial:** Incidents by licensed operators to offices, restaurants, homes, and landscapes.
- **Pest Control Operator (PCO):** Incidents involving a subset of commercial/industrial operators licensed to make applications to control structural pests.
- **Wood Destroying Organism (WDO):** Incidents involving inspections on structures for fungi, insects, and conditions that lead to pest conditions. No pesticide applications are made.
- **Residential:** Includes any application of a pesticide in a residential environment by the homeowner, resident, or neighbor.
- **Right-of-ways:** Applications made on public land such as roadways, electric lines and irrigation canal banks.
- **Other:** WSDA code for undefined use and includes licensing, storage, registration, records, and similar actions.

When violations were evaluated by type of license involved (Table 6), commercial applicators accounted for 57 of the 110 violations, followed by private applicators 15, public operators 6, unlicensed 22, and other six. (See Appendix E for definition of license types). This reflects an increase in violations by commercial applicators and a decrease in violations by individual users holding private applicator licenses.

Table 6 Type of License Involved with Cases Resulting in Violation

Commercial (application for fee)	57
Private applicator (application to own property)	15
Public operator (application to public property)	10
Commercial Consultant (gives advice only)	3
Dealer (sell other then Home & Garden Pesticides)	2
Private commercial	1
Unlicensed (general use, homeowner)	22

Table 7 Type of Complaint 1997

Type of Complaint	Complaints
Drift	50
Human exposure	42
WDO Inspection	23
Direct	21
License	14
Misuse	11
Animal/bird kill	10
Bee kill	8
Water contamination	6
Deliberate/deliberate misuse	5
Disposal	3
Other	11
Total	**204**

Table 7 shows the type of complaints. Drift and human exposure were the primary reasons for pesticide related complaints although there were concern with animal deaths (most were domestic animals) and bee kills. Frequently it is hard to determine which application was responsible for complaints about animal deaths and bee kills.

Pesticide complaints frequently result from an application going off target. Table 8 lists the most common sites where the pesticide originated or was applied, and the source of the complaint. Drift complaints from agricultural applications generally drift onto crops or people. Drift complaints reported from non-agricultural applications concern health or environmental risks.

Incidents were evaluated by target and complaint site. The following observations were made.

Table 8 WSDA Comparison of the Most Frequent Target and Complaint Sites 1997

Agriculture		Non Agriculture	
E. WA	**W. WA**	**E. WA**	**W. WA**
Target Site			
Orchards 13	Peas 2	Yard, Ornamentals 7	WDO 19
Rangeland, weeds 9	Irrigation Bank 1	Right-of-way 7	House/Apt 9
Small grains 4		Dealer (Sales) 3	Yard/Ornamental/Flowers 7
Potatoes 3		Weeds 3	Trees 3
			Vehicle ID/License 3
Complaint Site			
Human 13	Water 1	Yard, Ornamentals 9	House 20
Bees 4	Human 1	Human 6	Human 9
Plants, Ornamentals 4	Pasture 1	Weeds 3	Ornamentals 7
Orchards 3	License 1	Dealer (Sales) 3	Tree 3
Beans 3		Property 2	Water 2

- For Eastern Washington agricultural sites, the target crops most frequently were orchards, primarily apples. Pesticides applied to rangelands were the next most frequent target sites. Most of the complaints from agricultural applications were about possible human exposure to pesticides. This was fairly consistent with the 1996 data.
- For Eastern Washington, non-agricultural applications to lawns, gardens, ornamentals, and Right of Ways were the most frequent target sites for complaints. Lawns, gardens and ornamentals were also the most frequent site of the complaint with possible human exposure a close second.
- In Western Washington, only four agricultural application sites were involved. Two involved drift of an application to peas (human exposure and pasture), one involved an unlicensed applicator on a farm and one concerned an over rate application to an irrigation bank.
- Non-agricultural incidents in Western Washington generally involved applications made around homes and WDO inspection with no applications.

In comparison, in 1996 more complaints involved row crops in western Washington and there were more home and ornamental complaint sites in the non-agricultural environment.

The following example illustrates the potential severity of complaints reported to WSDA.

Use of agricultural pesticides on or around the home is illegal and unsafe.

WSDA # 16C-97 *A neighbor called WSDA complaining of alarming odors. WSDA found that 3 to 4 ounces of methyl-parathion had been used to control cockroaches in a home. The isolated incident resulted from use of a single container of the pesticide brought illegally into Washington from Mexico. The person using the product did not know the use was illegal, did not read the badly worn label and was unaware of the potential dangers. No health problems resulted. The product was removed by WSDA, the home was cleaned, tested for residue and the occupants were advised about legal pesticides for home insect control. Methyl-parathion, a highly toxic insecticide, is labeled only for a few specific agricultural uses.*

Pesticide application method involved in complaint

Since 1989 WSDA has tracked the application method involved in complaints (Table 9). In 1990, the number of complaints about aerial applicators dropped sharply. This was probably due to the increased aerial regulations in Eastern Washington. From 1990 to 1994, complaints about known aerial applications averaged about 50 per year. (Since the majority of applications are ground, they generate a higher number of complaints. They also tend to be applied in areas where there are more people).

Table 9 Pesticide Application Method Involved in Complaint

Pesticide Application Method	1995	1996	1997
Air	30	29	32
Ground	126	121	121
No Application	39	85	41
Unknown	64	16	10

How serious were these complaints?

In 1996, WSDA developed a severity rating scale for all complaints. The purpose of the rating scale was to assess the severity of each complaint and to track the reported severity of all complaints over time using a consistent measure. With increased education and use of more targeted pesticides, the severity of reported incidents on this rating system should decrease. Another reason for looking at severity of all complaints is because of the wide variety of reported complaints. Some complaints do not involve pesticides (i.e., licensing issues), while others allege serious health effects or economic damage. A consistent measurement was needed to accurately reflect on the severity of violation in terms of health or damage. The criteria used to assign ratings takes into account DOH determinations (if human exposure occurred), environmental and economic damage, and compliance with regulations.

Following investigation, in 1997, 78 percent of all complaints were determined to have a low severity rating of two or less (Table 10). Although there may have been violations associated with these investigations, individuals generally were given Notices of Correction or Verbal Warnings rather than fines or suspended license. In 1996, 85 percent of all complaints had a severity rating of two or lower. In 1997, the higher percentage of more severe cases reflect a series of animal poisonings (primarily dogs) from strychnine, some human exposure cases where the individuals were taken to hospital emergency rooms for care following pesticide exposure and some incidents involving bee kills.

The following table lists the severity of the 1996 and 1997 WSDA complaints and the criteria used in making the determination.

Table 10 Severity Rating of WSDA Complaint Cases 1996-1997

Rating	Number of Complaints 1996	Number of Complaints 1997	Criteria
0	**64**	**28**	Problem not due to pesticides and/or no cause determined; PCO/WDO inspection with no violations.
1	**71**	**67**	Pesticides involved, no residue, no symptoms occurred; possible pesticide problem, not substantiated; issues involving records, registration, posting, notification (multiple chemical sensitivity) or licensing; DOH classified "unlikely" or "unknown."
2	**79**	**64**	Residue found, no health symptoms (human, animal); health symptoms not verified; multiple minor violations; off label use; worker protection violations; PPE violations with no health symptoms; plants with temporary or superficial damage only; PCO/WDO faulty inspections; DOH classified "possible."
3	**22**	**30**	Minor short-term health symptoms (rash, eye irritation, shortness of breath, dizzy, nausea, vomiting); bee kills less than 25 hives; minor fish kills; economic plant damage under $1000; evidence of deliberate economic fraud; DOH classified "probable."
4	**11**	**8**	Short-term veterinary or hospital care; bee kills over 25 hives; significant fish kills; significant economic plant damage over $1000; environmental damage; illness involving children; DOH classified "probable."
5	**4**	**7**	Veterinary or hospital care, overnight or longer; physician diagnosed children's illness as caused by pesticides; animal death due to pesticides; significant environmental damage; DOH classified "definite."
6	**0**	**0**	Human death due to pesticides.
Total	**251**	**204**	

Type of Pesticide Involved in Complaint

The following types of pesticide were identified by residue analysis or application records (Figure 2). Four pesticide application complaints occurred where the type was unknown. Some cases involved more than one type of pesticide. For example, a complaint could result from a tank mix of insecticide and fungicide and would be listed under both categories. Forty-one complaints involved tank mixes. Forty-eight complaints did not involve a pesticide.

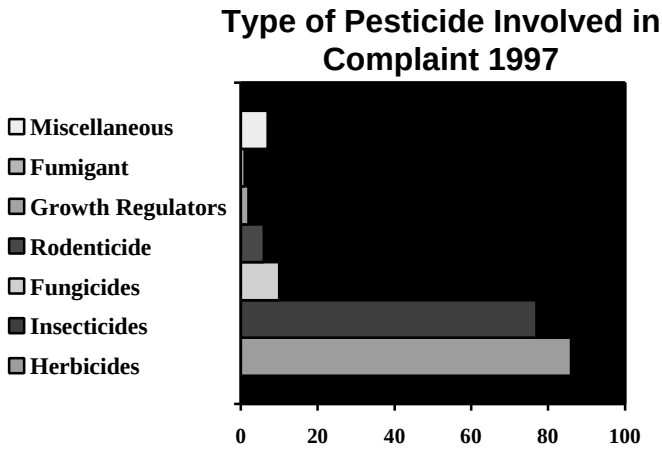

Figure 2

The same general type of pesticide active ingredients were most frequently involved in violation cases during 1997 as in previous years. The active ingredients were: 2,4-D, glyphosate, chlorpyriphos, dicamba, and azinphos-methyl.

In recent years, the number of complaints relating to Wood Destroying Organism (WDO) inspections and treatment has increased. Banks generally require structural inspections when property ownership changes. Making determinations about wood destroying organisms inspections are particularly difficult for homeowners. Most people do not have the training to correctly identify insects and fungi and are reluctant (or unable) to crawl under the house to verify the inspection report. WDO complaints generally fall into three groups: work that was not done, insects that were not correctly identified, and work that was not needed. WSDA is often called in months or even years after the inspection when not corrected problems become visible.

WSDA # 47T-97 *A homeowner complained to WSDA after an initial inspection report revealed structural damage to several subfloor beams and joists, cellulose debris in the crawl space and the presence of powderpost beetles. The company submitted a bid to correct the problems and treat the area. The work was supposedly completed. A later inspection by another company stated the work had not been done. WSDA inspected the area and found termites, termite damage, rot fungus and cellulose debris. An inadequate vapor barrier also led to an accumulation of water. No evidence of the chemical treatment for beetles was found. WSDA concluded that the insect problem was misidentified, the rot-damaged wood was not completely removed and conditions leading to WDO conditions (debris and water) were not reported. As this company had several prior complaints, WSDA assessed a fine and a period of license suspension.*

WSDA Enforcement Action

Table 11 1997 WSDA Agency Actions

No Action Indicated	93
Technical Assistance	1
Verbal Warning	11
Advisory letter/Warning letter	16
Notice of Correction	63
Notice of Deficiency	1
Administrative Action	17
Referred	2
Total Investigations	204

In 1997, 110 of the 204 total complaints resulted in violation. Eighty-nine of these involved pesticides and 21 did not involve pesticides. Table 11 lists the type of agency actions taken. Notices of correction and advisory or warning letters were the most frequent form of corrective action taken by WSDA.

Other Agencies Involved

WSDA consults with other state, federal, and local agencies and jurisdictions. For example, in 50 cases WSDA consulted with DOH regarding human exposure issues, eight times with local government, seven times with the U.S. Environmental Protection Agency (EPA), five times with veterinarians, and three times each with L&I and Ecology.

WSDA Observations
It is encouraging to see the number of complaints decrease since 1992 in spite of increased regulations and improved reporting systems. A comparison of data year-to-year shows that various elements such as weather, product availability, pests, crops, and legal restrictions are conditions that change the frequency and type of complaints reported to WSDA.

The following more specific observations can be made from the 1997 incident data

- Many bee kills could be prevented by controlling broad leaf weed bloom in orchards prior to the application of organophosphate and carbamate insecticides. Weeds can be controlled by mowing, cultivating or applying a labeled herbicide. Applicators should be aware of hives that are in the area.

- In urban areas, neighbor disputes can generate a significant amount of workload for WSDA. Herbicides are sometimes used as a way of retaliation to damage property, or the complainant thinks they were used illegally. WSDA investigates all complaints, but in these circumstances, it is difficult to legally determine the applicator.

- Complaints about human exposure to pesticides are another large part of WSDA pesticide investigations. Applicators are reminded that it is important to wear the required Personal Protective Equipment, carefully check the area prior to applications and to make sure there is no unprotected exposure during applications. This is as true for urban and commercial applications as it is for agriculture. In a 1997 case, two people became temporarily ill from methyl bromide escaping from a tent fumigation of a warehouse. The area was apparently not sufficiently placarded to warn people away from the application site.

Department of Ecology

In 1997, the Department of Ecology (Ecology) reported 49 pesticide related complaints involving threats to air, water or soil. (These do not include pesticide-contaminated sites involved in evaluation and cleanup.) Complaints were reported from 20 counties. Thirty complaints came from eastern Washington and 19 from western Washington. The complaints were received from a variety of sources, including private citizens 27, other state agencies 12, local health or fire departments eight, and federal agencies two. Table 12 shows the types of pesticide related complaints reported to Ecology.

Table 12 1997 Type of Pesticide Complaint

10	20%	Pesticide threatening ground or surface water
10	20%	Pesticide disposal or waste concern
8	16%	Spills
3	6%	Unsafe pesticide storage
18	37%	Other (i.e., fire, fumigation)

In 44 (90%) incidents, Ecology responded within 24 hours. Forty-eight of the 49 complaints were resolved and closed in 1997. Twenty-four complaints (49%) occurred in the agricultural environment, 16 (33%) in the commercial/industrial environment, and nine (18%) resulted from residential activities.

After the initial response, 19 complaints were referred to other state or local agencies. Of the 49 complaints, 18 caused no ecological impact, 14 involved some form of clean up or removal of materials, 13 could not be substantiated, two involved human or animal health concerns, one is an on-going investigation by the Ecology Toxics Cleanup Program and one resulted in a Notice of Correction.

Pesticide Risk Reduction Activities

Ecology is working to identify changes in farming activities or technology that can reduce the risks to human health and the environment from agrichemical use. Ecology's Washington State Pesticide Monitoring Program participates on the Interagency Groundwater Coordination Committee charged with this issue.

Contaminated Site Cleanups

Ecology is working to address concerns about possible health effects of pesticide contaminated sites. Lead-arsenate contamination of orchard lands is a growing issue because of redevelopment into more public uses such as residential, commercial and recreational. Lead arsenate was commonly applied as an insecticide through the mid-1940's. Between 80,000 and 120,000 acres of land in Central Washington and other cropland in Western Washington may be contaminated with lead-arsenate. Many locations may be contaminated at concentrations above cleanup levels (health-based standards) established in the Washington State Model Toxics Control Act. Ecology and other agencies are collaborating with local landowners and others in the community

to understand the nature and extent of contamination and to understand potential health exposures and risks. Group efforts will also evaluate farming practices that might reduce risk, and to communicate known risks to the landowners and community. Preliminary efforts have begun to find organizations and people interested in participating in this process.

Ecological Pesticide Monitoring Program Activities and Results

The Washington State Pesticide Monitoring Program (WSPMP) was started in 1991 by the State Legislature to monitor pesticide residues in ground water and surface water. The goal of the WSPMP is to characterize pesticide residues geographically and over time in ground and surface water, including sediments and biota throughout Washington.

A total of 38 surface water sites were sampled from 1992 through 1996 (Figure 1, Appendix D). In addition, fish were collected from 27 sites (Figure 2, Appendix D). Forty-five pesticides have been detected in 129 water samples from the 38 sites (Table 1, Appendix D). Pesticides and PCBs found in 75 fish tissue samples are summarized in (Table 2, Appendix D). Nine of 15 insecticides detected in water samples were found at concentrations exceeding water quality criteria; none of the 30 herbicides detected were above criteria. Three of the organophosphate insecticides: azinphos-methyl, chlorpyrifos, and diazinon are frequently detected at levels above water quality criteria. Dieldrin, DDT and its breakdown products, and PCBs are compounds that are commonly found in fish tissue at concentrations exceeding human health and wildlife criteria.

Agricultural Pesticide Monitoring

Six insecticides were identified in water samples in 1994, from three sites representing orchard pesticide use (Davis, 1996). All detections for these six compounds exceeded water quality criteria. Azinphos-methyl, chlorpyrifos, and diazinon were found at all three sites. These three pesticides were also found in samples from Mission Creek collected in 1993. In addition, azinphos-methyl was detected in Mission Creek in 1992. DDT was found in Mission Creek in 1993 and 1994, and in Stink Creek in 1994. Carbaryl and malathion were each identified once. In 1993, endosulfan was also found in a sample from Mission Creek.

High concentrations of five insecticides were found in WSPMP samples collected in 1994 and 1995 from Grays Harbor County Drainage Ditch No.1 (GHCDD-1) (Figure 1, Appendix D). These results prompted an intensive survey in 1996 to assess pesticide contamination from cranberry bog drainage in the Grayland area. Results from water samples collected for the WSPMP (Davis, 1998), combined with results from the intensive survey (Davis et al., 1997), showed that fauna in the drainage ditches were being severely impacted. The cranberry industry is developing farming practices that will reduce the concentration of insecticides in the ditches.

Urban Pesticide Monitoring

Pesticide data from streams in the Puget Sound area were recently summarized in a fact sheet jointly produced by Ecology and the U.S. Geological Survey (Bortleson and Davis, 1997). Urban pesticide use was identified as a potential problem due to the high number of chemicals

found in urban streams. The numbers of pesticides found were similar to, or higher than most agricultural sites sampled, and the amount of each pesticide used in urban areas was reported to be higher than in agricultural areas. Additional urban sites were sampled in 1996 (Davis, 1998).

Historical Pesticides in Fish

Results from fish tissue collected for the WSPMP indicate that there is wide spread DDT contamination throughout the Yakima and Columbia River basins that may be impacting fish-eating birds. Fish collected from the Wenatchee River in 1993 (Davis et al., 1995), and from Lake Chelan, and the Entiat and Okanogan Rivers in 1994 (Davis and Serdar, 1996) had elevated levels of DDT and its breakdown products. Data from 1995 (Davis et al., 1998) show that fish from the Yakima River, Cowiche Creek, and waterbodies in the Mid-Columbia area commonly had levels of DDT exceeding wildlife protection criteria. (See Appendix D for complete References)

Consumption of contaminated fish is also a human health concern. Concentrations of DDT were found in fish collected from the Yakima River and Cowiche Creek for the 1995 WSPMP (Davis et al., 1998). DDT levels were commonly found to exceed human health screening values, which supports the recommendation by DOH to eat fewer bottom fish from this area. Samples were also collected from lakes in the Mid-Columbia area for the 1995 WSPMP. Concentrations of dieldrin and DDT were found in bass fillets but more information is needed to assess potential impacts to people who might regularly eat the fish.

Department of Health (DOH)

The Department of Health Pesticide Program is responsible for investigating reports of illness suspected of being related to pesticide exposure. The data collected from the investigations are analyzed to identify public health problems and develop strategies in prevention.

The DOH portion of the PIRT Report is organized into four sections. Section 1 gives an overview of the number and nature of cases investigated by DOH Pesticide Program in 1997. Section 2 reviews occupational and agricultural cases; Section 3 evaluates incidents in urban and suburban use of pesticides; and Section 4 reviews childhood pesticide exposures.

Section 1: Number and Nature of DOH Investigations

For 1997, the Pesticide Program received 365 reports of incidents involving a total of 441 individuals exposed to pesticides (Figure 3). The majority (82%) of suspected pesticide incidents occurred in the six months between April and September. The number of incidents reported as well as the timing of the year is consistent with previous years.

Reported Incidents and Cases 1992 -1997

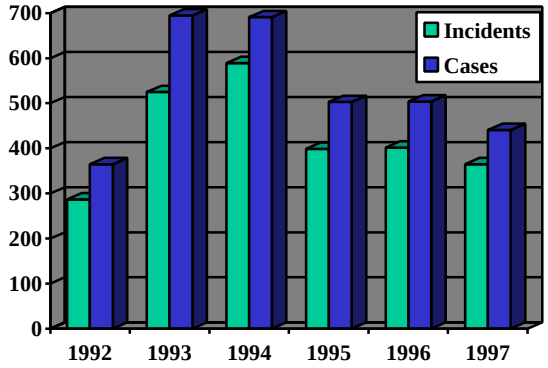

Figure 3

Incident reports come to the Pesticide Program through a variety of agencies as well as the community. In 1997, the majority (81%) of incident reports came from the Department of Labor and Industries and the Washington Poison Center (WPC). Most health care providers find it more convenient to report through the WPC. In 1997, DOH responded within 48 hours to ninety-five percent of reported illness.

Classification of Investigated Cases

The investigators of the Pesticide Program interview individuals and witnesses (when appropriate), obtain pesticide application and relevant medical records, as well as conduct field visits. This information is used to classify a case as to how likely the symptoms relate to the exposure. Classifications depends on how verifiable the exposure and illness event are through documentation or witnesses. Each case classification is centrally reviewed. In Appendix C are the definitions of the eight classifications. Figure 4 shows the distribution of case classifications.

Classification of 1997 Cases

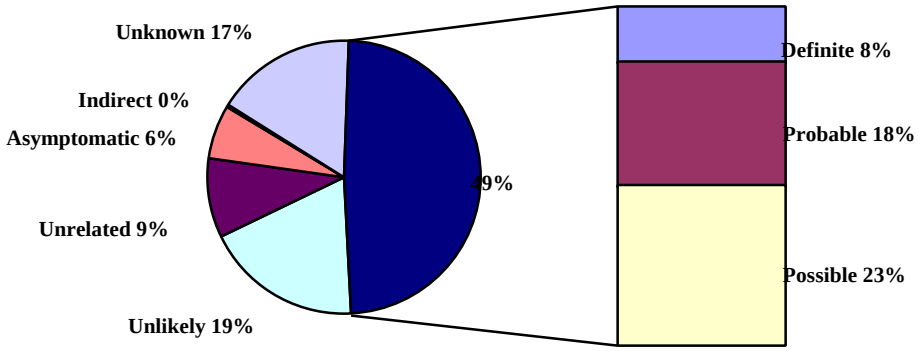

Figure 4

In 1997, 214 (49%) of the reported cases were determined to be definitely, probably, or possibly related to pesticide exposure. This compares with 237 (47%) in 1996, and 216 (43%) in 1995 (Table 13). When the asymptomatic rodenticide cases (which were not investigated from 1995 forward) are removed from the 1994 database, the 1994 percentage of definite, probable, or possible cases is comparable (41%) to 1995 data.

Table 13 1992 - 1997 Definite, Probable and Possible Case Classification

Classification	1992	1993	1994	1995	1996	1997
Definite	20	53	41	38	37	36
Probable	72	141	79	46	81	78
Possible	91	157	90	132	119	100
Total DPP	183	351	210	216	237	214
Percent	50%	50%	30%	43%	47%	49%
All cases reported	365	696	691	503	504	441

Nature of Pesticide Exposure

Of the 214 cases related to pesticide exposure, 93 were associated with agricultural applications, 64 were residential, and 41 involved applications to commercial buildings or other situations. (Table 14). Eight exposures did not involve applications (e.g., intentional or inadvertent ingestions by children, and exposures at pesticide retail and wholesale sites). DOH observed an increase in number of cases occurring as a result of applications to commercial buildings such as schools, offices or their grounds, and a slight decrease in other applications and exposures which did not involve an application.

Table 14 1996 & 1997 DOH Cases by Type of Application (definite, probable, possible)

Type of Application	1996	1997
Agricultural applications	97 (41%)	93 (43%)
Non agricultural applications:		
Residential applications	66 (29%)	64 (30%)
Applications to commercial buildings, schools, offices, or their grounds	23 (10%)	41 (19%)
other applications	17 (7%)	9 (4%)
Exposure did not involve an application	32 (14%)	8 (4%)
Total	**237**	**214**

Eighty one (38%) exposures resulted from direct contact with a pesticide while mixing/loading or applying (Table 15). Sixty Seven percent resulted from contact with either airborne or surface residues after an application was completed. Forty cases involved pesticide drift from application site. Except for exposures to residues, which increased by 10 percent, the results are similar to what DOH has seen in past years.

Table 15 1997 DOH Cases by Type of Exposure (definite, probable, possible)

Circumstances of Exposure	Cases	Percent
Direct exposure while handling pesticide	81	38%
Exposure to residues	67	31%
Drift	40	19%
Accidents	9	4%
Ingestion	4	2%
Other	13	6%
Total	**214**	**100%**

Number of Persons Involved

The majority (89 percent) of 1997 incidents involved one individual. Thirty- seven incidents involved two people, and four involved five people. Examples of incidents involving five or more individuals follow:

DOH 970130 *Five county employees developed headaches, nausea, dizziness, nose and throat irritation after smelling a pesticide. There had been an application of a microbicide close to an air vent. The vapors traveled through the ventilation system. (Classification: 5 probable, Severity: 5 mild)*

DOH 970251 *Five individuals became ill on a Monday when they came to work following a pesticide application the previous Friday to control roaches. Symptoms resolved when they left the building. Medical care was sought on the fourth day of symptoms. (Classification: 5 probable, Severity: 5 mild)*

DOH 970320 *Five adults received medical attention for dermal exposure to chemical residues on trees while picking pears. The field had been sprayed seven days prior to entry with fungicide (Classification: 2 probable, 3 possible, Severity: 5 mild)*

Location

Pesticide incidents were reported in all but six counties. The ten counties with the most reported incidents are shown in Table 16.

Figure 5 shows the location of definite, probable, or possible cases for 1996 and 1997. A more complete analysis of pesticide incidents in any given county is available from the Pesticide and Surveillance Section on request.

Table 16 Top Ten Counties with Reported Incidents in 1997

County	Incidents	Individuals
Yakima	69	77
King	43	49
Grant	28	38
Franklin	21	21
Spokane	20	22
Benton	19	22
Pierce	16	25
Snohomish	18	19
Chelan	16	18
Okanogan	14	34

Combined 1996 - 1997 County Distribution of Cases

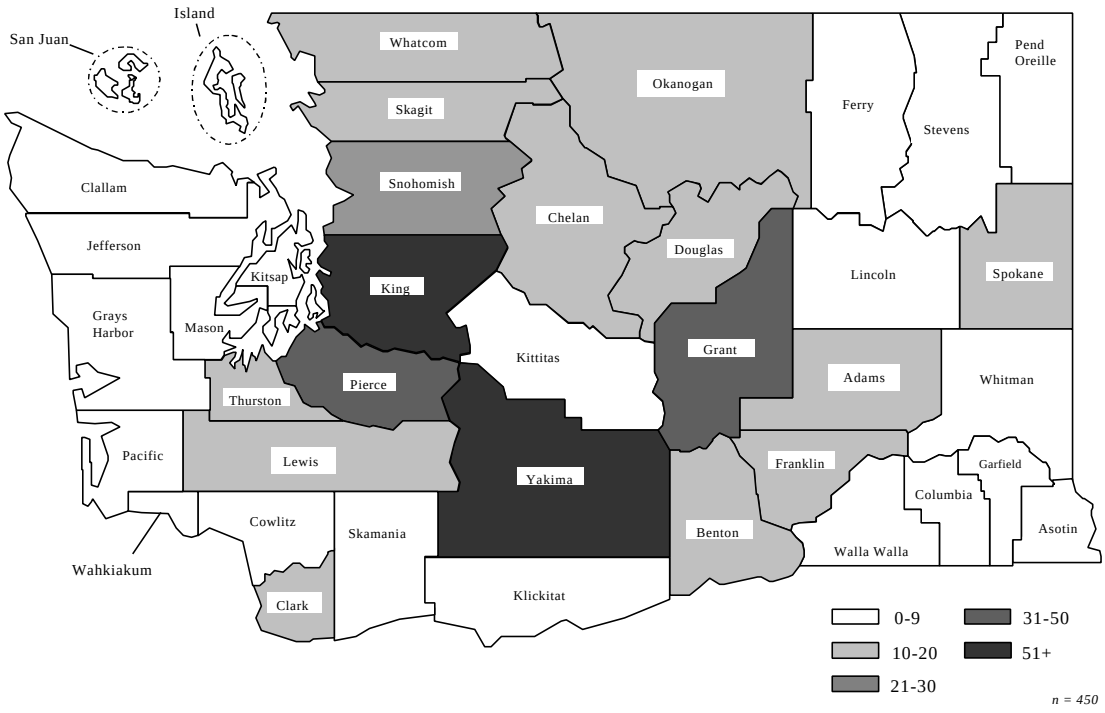

Figure 5

Severity of Medical Outcome
In 1995, DOH began coding cases according to the severity of health outcome (see Appendix C for a description of severity codes). In 1997, Figure 6, the majority (99%) of cases had mild or moderate medical outcomes. Eighty-eight percent (188) of the mild or moderate cases, sought medical care at a doctor's office, emergency room, or walk in clinic.

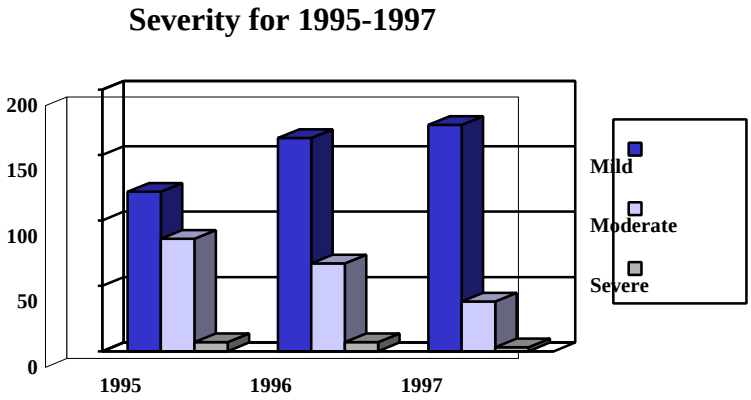

Figure 6

Following investigation, five of these cases were determined not to be pesticide related. Three pesticide cases were considered to have severe health outcomes. One resulted from intentional pesticide ingestion and the remaining two cases are as described:

DOH# 970136 *Two farmworkers were seen in the emergency room. One worker was treated with atropine and admitted overnight to the hospital for possible OP poisoning. They had walked into a field sprayed (myclobutanil and azinphos-methyl) before the restricted re-entry interval (REI) had expired. Symptoms included shortness of breath, nausea, dizziness, chest tightness and shaking. (Classification: probable, severity: severe)*

DOH# 970174 *A crop advisor developed dizziness, weakness, anxiety, headache, eye and nose irritation after he splashed approximately 6 ounces of pesticide (methamidophos, chlorothalonil and copper hydroxide) onto himself when mixing cleaning agents, including ammonia and chlorine bleach. (Classification: definite, severity: severe)*

Pesticide Products Involved In All Cases

DOH defines a causal product as a chemical formulation which includes the pesticide active ingredients and inerts (carriers, adjuvants, solvents,synergists, etc.). The entire formulated product is considered in the investigation. Sixty-six cases involved tank mixes of two or more casual products. While reviewing data for the number of different causal products, 60 different products were found. A few products were involved with slightly more frequency such as 2,4-D, glyphosate, and azinphos-methyl.

Table 17 shows the relationship between pesticides involved in definite, probable and possible cases in agricultural and non-agricultural settings. Insecticides were involved in 123 or 57% of the cases. More cases classified as definite occurred in agriculture, while more probable and possible cases occurred in the non agricultural environment, and more organophosphate insecticide cases occurred in agriculture. This is consistent with the use of agricultural pesticides that have a higher percentage of active ingredient. The only two severe cases investigated in 1997 involved agricultural workers.

Table 17 1997 Cases with Relationship to Pesticide Exposure Summarized by Pesticide, Agricultureal/Non-Agricultural, and Degree of Relationship

Pesticide	Agricultural			Non-Agricultural			Total
	Definite	Probable	Possible	Definite	Probable	Possible	
Organophosphate (Insecticide)	4	4	7	0	4	17	36
Herbicides	4	6	5	2	5	9	31
Fungicides	1	3	4	1	0	1	10
Pyrethroids (Insecticide)	2	0	2	2	4	6	16
Fumigants	1	3	1	0	2	1	8
Carbamates (Insecticide)	0	1	0	0	2	1	4
Growth Regulators	1	0	3	0	0	0	4
Chlorinated Hydrocarbons (Insecticide)	0	0	0	0	0	3	3
Botanical	0	0	0	1	4	2	7
Antimicrobial	2	2	0	0	7	2	13
Other	2	0	2	5	3	1	13
Unknown	0	0	3	0	0	4	7
Combination of Fungicide(s) with AChE Inhibitor Insecticide(s)	2	4	5	0	0	0	11
Combination of AchE-Inhibiting Insecticides	1	1	1	0	1	2	6
Combination of Insecticides including both AChE Inhibitors and Others	1	0	1	0	8	2	12
Combination of Insecticides other than AChE Inhibitors	0	0	2	0	5	6	13
Combination of Fungicides	0	1	0	0	0	0	1
Combination of Fungicide(s) with Insecticide(s) other than AchE Inhibitors	0	0	2	0	0	0	2
Combination of Fungicide(s) with both AChE Inhibitors and other Insecticides	1	2	1	0	0	0	4
Combination of AChE Inhibiting Insecticide(s) with an Insect Growth Regulator	2	0	0	1	0	0	3
Combination of Herbicides	0	2	1	0	5	2	10
Combination of Growth Inhibitors	0	0	1	0	0	0	1
Total	23	29	41	13	49	59	214

Section 2: Occupational Cases of Pesticide Related Illness

In 1997 sixty six percent (290) of all reported cases investigated by DOH involved a pesticide exposure on-the-job. Of these, 145 were classified as definite, probable or possible. Seventy-nine involved agricultural workers and 66 were from other occupations.

Figure 7 shows DOH agricultural and non-agricultural occupational case classifications from 1992 to 1997. The peak of agricultural occupational cases in 1993 is attributable to two unique circumstances: workers exposed to Phosdrin and an agricultural drift incident.

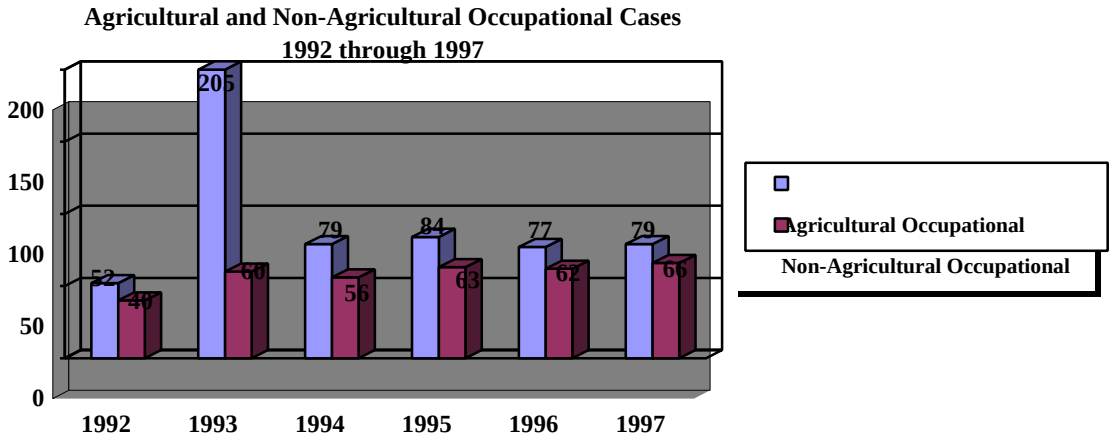

Figure 7

The annual number of occupational definite, probable, or possible pesticide related agricultural cases has remained steady at around 80 per year since 1994. Table 18 shows the occupation of workers involved in DOH cases. Among agricultural workers, those who directly handled pesticides (e.g., mixers, loaders, applicators) were at highest risk for direct exposure, and accounted for 37 (47%) reported illnesses in 1997. The remaining 53 percent of occupational agricultural cases were thinners, irrigators, and other agricultural workers exposed either to drift or to residues on foliage and equipment.

Other occupational groups exposed while directly handling pesticides included: exterminators, lawn and garden care professionals, and building and grounds maintenance workers. Each year, a number of non-agricultural workers are exposed to workplaces that have been treated with pesticides. Office workers and restaurant/bar employees report this type of exposure most frequently.

Table 18 Occupations of Pesticide Cases in 1996 and 1997 (definite, probable, possible

	1996	1997
Agricultural Workers		
Pesticide applicators/mixers/loaders	39	37
Thinners	21	7
Harvesters	1	8
Cleaning/fixing equipment	3	1
Irrigators	1	5
Other field worker	9	18
Nursery/greenhouse worker	3	3
Non Agricultural Workers		
Commercial pesticide applicators *(licensed for structural or landscape pest control)*	7	4
Property maintenance staff *(janitors, housekeepers, grounds maintenance)*	7	12
Employees at places of pesticide retail *(loading dock workers, stockers, cashiers)*	11	6
Employees repackaging pesticide for wholesaler*	8	0
Office workers	11	27
Miscellaneous indoor workers	16	10
Miscellaneous outdoor workers	2	7
Total	**139**	**145**

** Eight workers exposed while repackaging insecticide dust.*

Table 19 1997 Circumstances of Occupational Pesticide Exposure (definite, probable, possible)

Nature of Exposure	Agricultural	Non Agricultural
Exposed while handling pesticide product:		
applying with vehicle mounted equipment	26	2
applying with handheld equipment	5	12
applying other	2	1
mixing/loading for any application	7	-
fumigation in field	1	1
Exposure to surface residues or residual volatiles in:		
agricultural field or greenhouse	20	-
yards, landscapes	-	5
building, other structures	1	25
Exposed while cleaning/fixing equipment	2	1
Exposed to pesticide drift	13	12
Accidents (spills, etc.)	2	5
Other/unknown	-	3
Total	**79**	**66**

Table 19 shows how individuals were exposed to pesticides on-the-job. In 1997, compared to 1996, a smaller percentage of cases involved direct pesticide handling and more involved exposure to pesticide residues. Fewer agricultural workers were exposed to pesticide drift in 1997 than in 1996. Agricultural and non-agricultural occupational exposures to residues on foliage or in buildings and landscapes accounted for 35 percent of the cases.

Section 3: Incidents Involving Agriculture

Half (51%) of the total number of pesticide related exposure reports in 1997 occurred in an agricultural setting and involved 223 individuals. Ninety-three (42%) agricultural related illnesses were classified as definitely, probably, or possibly related to pesticides. Seventy-nine of these were occupational and 14 involved individuals not working at the time of exposure. There were 14 definite, probable, or possible agricultural cases that were not job related. Thirteen of these were mild in severity and one was moderate. The crops involved were fruit 12, field crops 1, and vegetables one. The 14 cases resulted from the following routes of exposure: drift 9, field residues 3, field fumigation 1 and one application. Individuals in 74 of the 79 occupational cases were involved in the production of an agricultural product. Table 20 shows the number of occupational cases by agricultural product.

Table 20 1997 Occupational Cases by Type of Agricultural Product (definite, probable, possible)

Agricultural Product	Total	
Fruit	49	(66%)
Field crops	14	(19%)
Nursery/greenhouse	5	(7%)
Livestock	3	(4%)
Forest	2	(3%)
Other	1	(1%)
Total	**74**	

Consistent with prior years, the largest number (49 or 66%) of agricultural occupational definite, probable, or possible cases occurred in the tree fruit industry, primarily apples. Fourteen cases involved field crops, and 11 cases involved nurseries/greenhouses, livestock, forest and berries.

Application of pesticides, either with vehicle mounted or handheld equipment, accounted for 37% of the 93 agricultural related pesticide illnesses. Twenty-five percent of the illnesses resulted from exposure to residues and 24 percent from drift.

Table 21 Job Activity and Exposure Relationship Associated with Agricultural Production Types 1997

Type of Agricultural Production							
	Relationship to Exposure						
	Def/Prob	Pos	Def/Prob	Pos	Def/Prob	Pos	
Job Activity	**Field Crops**		**Fruit Production**		**Other****		**Total**
Applicator	6	3	11	11	4	1	**36**
Farm work/general	3	-	4	2	3	2	**14**
Thinning	-	-	4	10	-	-	**14**
Mixer/loader	1	-	2	-	1	-	**4**
Chemigation	1	-	-	-	-	-	**1**
Irrigation	-	-	-	5	-	-	**5**
Total	**11**	**3**	**21**	**28**	**8**	**3**	**74**

*** Includes berries, forest, nursery/greenhouse, livestock, etc.*

Seventy-eight percent of agriculturally related cases had outcomes considered to be mild. Nineteen percent were moderate and two percent were considered severe. The severe cases (page 27) involved an exposure to field residues and a drift exposure in a fruit crop.

Exposure to Field Residues

In agricultural cases, pesticide exposure occurs from three primary sources: ground application, field residues and drift. Each of these pathways of exposure require different strategies for prevention. Ground application cases generally result when workers are not wearing appropriate personal protective equipment (PPE). Drift continues to occur although frequency is decreasing, but cases resulting from field residue exposure have increased. In 1997, 34 percent (76) of the agricultural illnesses investigated involved residues in the field (Table 22), 23 of these cases were classified as definite, probable, or possible. In 1996, 100 similar reports were investigated with 12 classified as cases.

Recent research [1]* at the University of Washington indicates that during a typical season thinners may absorb more pesticide than applicators due to their daily continuous contact with pesticide treated foliage. While applicators may be exposed to sudden accidental high doses of pesticide, they are, because of label requirements, more likely than thinners to wear protective equipment.

Table 22 Comparison of Source of Pesticide Exposure 1996-1997

Exposure Activity	1996 Agric	1996 Agric Def, Prob Poss	1997 Agric	1997 Agric Def, Prob, Poss
Residue field	100	12	76	23
Residue structure	1	1	1	1
Ground Application	61	29	41	27
Drift	57	30	47	22
Pack/processing	1	-	21	-
Hand Application	13	4	7	5
Accident	5	4	5	2
Clean/fix	5	3	5	2
Ground mixing/aerial	3	3	-	-
Mix/loading ground	-	-	9	6
Mix/load hand	-	-	1	1
Aerial mixing/loading	1	1	-	-
Air application	1	-	-	-
Other application	1	1	2	2
Fumigation field	-	-	2	2
Other	8	-	3	-
Unknown	3	-	3	-
Total	**262**	**97**	**223**	**93**

[1] Loewenherz C, Fenske R. Simcox N, Bellamy G, Kalman D. Biological Monitoring of Organophosphate Pesticide Exposure Among Children of Agricultural Workers in Central Washington State. Envrin Health Perspectives 105:1344-1353 (1997).

Section 4: Urban/Suburban Cases of Pesticide Related Illness

Of the 441 cases investigated in 1997, 218 were associated with non-agricultural pesticide use. DOH considered 121 (57%) of these to be definitely, probably, or possibly related to pesticide exposure (Table 23).

One hundred cases (83%) were exposures associated with an actual application of pesticide. Eighty-six of these occurred at residential or commercial sites (i.e., homes, apartments, office buildings, and restaurants). 47 percent of the 86 cases involved an application by a professional PCO or lawn care service. The remaining cases were associated with pesticides applied by a homeowner, co-worker, or other unlicensed person.

Table 23 1997 DOH Source of Exposure for Non Agricultural Pesticide Use (definite, probable, possible)

Source of Exposure	Cases
Applications to:	
Residential building or grounds (home apartment)	*54*
Commercial building or grounds (offices, restaurants, hotels)	*32*
Public park	*4*
Roadside/Industrial	*6*
Veterinary clinic	*1*
Irrigation ditch	*3*
Other	
***Exposures to stored or spilled pesticide**:*	
Pesticide retail (cashiers, stockers, receiving dock, customers)	11
Other exposures:	4
Children Playing	2
Ingestion accidental	2
Ingestion intentional	2
Handling exposed animals	
Total for all non-agricultural pesticide use	**121**

Eleven non-agricultural exposure cases involved an exposure at retail outlets to a spilled or improperly stored pesticide. Two individuals developed symptoms from handling dogs that had become ill from a pesticide exposure.

Table 24 shows the pest targeted by applications at 86 residential or commercial sites. Seventy percent of these cases involved use in and around structures, 20 percent involved landscape or garden use of pesticides, and 10 percent involved applications directly to human skin or hair.

Table 24 Target Pest for 1997 Cases[1] Associated with Pesticide Applications at Residential and Commercial Sites

Subject of Application	DOH Cases Associated with Use
Landscape/garden use:	
Weeds	12
Insects	5
Use in/around structures:	
Termites	4
Fleas	5
Cockroaches	15
Ants	10
Microbials	7
Insect unspecified or other	19
Applications to people:	
Lice creams/shampoos	7
Mosquito repellents	2
Total	**86**

[1] Definite, Probable and Possible Cases

As in the previous two years, insecticide exposure was involved in the majority (57%) of DOH non-agricultural incidents. Illnesses associated with herbicide use accounted for 16%of incidents. The most common insecticides involved were Pyrethrins and synthetic pyrethroids (e.g., cyfluthrin, esfenvalerate, permethrin) organophosphates and carbamates (e.g., chlorpyrifos, propoxur). There were three cases where an adverse outcome was associated with the use of Lindane for head lice control. One intentional ingestion was reported to DOH that had an outcome classified as severe (04). Eighty three percent of the 121 cases resulted in medical outcomes classified as mild. The data continues to suggests a need for improved education regarding safe pesticide use in the urban setting.

Section 5: Incidents Involving Children

Sixty-one individuals 18 years of age and less accounted for 14 percent of the 441 reported cases. This is considerably less than the 92 reported in 1992, 165 in 1993, and 230 in 1994, but compares with the 53 reported in 1995, and the 69 reported in 1996. The decrease in 1995 reflects DOH and WPC policy not to investigate childhood asymptomatic rodenticide exposures.

The 61 cases involved 44 different incidents: Thirty-five cases were non-agricultural, nine occurred in agriculture and 22 exposures took place in the home. Insecticides were involved in the majority of the incidents.

Twenty-four (7 females and 17 males) of the 61 cases were determined to be definitely, probably, or possibly related to pesticides. Thirteen children were under the age of six, six were ages 6-10, and five were ages 11-18. The severity of the 24 cases were 21 (88%) mild, and three (13%) moderate. The principle routes of exposure for childhood related cases were accidental (application of head lice shampoo, children playing with pesticides) and drift from nearby applications.

Thirteen of the 61 childhood cases occurred on the job, and seven of these occurred in agriculture. The three occupational childhood (all eighteen years old) cases classified as definite, probable or possible are described below:

- **Case 970090 (definite, severity mild)** *An 18 year old male was sprayed in the face while cleaning a clogged sprayer hose. The tank had been rinsed out but there was solution in the hose. He rinsed his eyes and went to the ER for follow-up.*

- **Case 970228 (probable, severity mild)** *An 18 year old female presented to the ER complaining of a rash to the hands and leg that developed while she was cutting asparagus in a field treated with herbicides. She was treated for contact dermatitis.*

- **Case 970211 (probable, severity mild)** *An 18 year old male working at a hardware store contacted a leaking insecticide container while stocking shelves. He wore the saturated gloves for about 20 minutes before taking them off.*

In 1997, eleven childhood cases involved insecticidal lice shampoo. These included accidental ingestion by the child (under the age of 2), confusing the insecticidal shampoo for medicine, overuse of the product and the product getting into the eyes.

Incidents Involving Children from 1993 through 1997

Table 25 shows all reported cases involving children from 1993 through 1997. The decrease in 1995 reflects DOH and WPC policy not to investigate childhood asymptomatic rodenticide poisonings.

Table 25 Pesticide Poisonings Involving Children 1993-1997

Year	Reported Cases	Cases*
1997	69	24
1996	61	28
1995	53	16
1994	230	16
1993	169	35
Totals	**582**	**119**

Table 26 Age Breakout for 1993 - 1997 Suspected Childhood Cases

Age	Cases
Under 1	19
1	153
2	135
3	61
4	30
5	13
1-5 subtotal	411
6-10	72
11-18	99
Total Childhood Suspected Cases	**582**

The age group most frequently involved in children's pesticide poisoning is the (newly mobile) one and two year-olds (Table 26). This age group makes up 70% of the total suspected childhood cases.

DOH Observations

There was in 1997 a slight decrease in both the numbers of incidents and cases from the previous two years. Also, it is encouraging that overall the severity of incidents appears to be decreasing. This is most likely due to increased educational efforts directed toward licensed users, and the removal from use of many of the highly toxic insecticides.

The number of occupational cases both agricultural and non-agricultural has remained constant for several years. However, the number of cases found to have some relationship to pesticide exposure increased slightly from 37% in 1996 to 42% in 1997. Review of occupational case files would indicate there still is a need for education associated with wearing and maintenance of proper personal protective equipment.

The number of cases occurring as a result of applications to commercial buildings such as schools, offices or their grounds increased in 1997. The percentage of non-agricultural cases determined to be related to pesticide exposure remained at 56 -57% for the third year. The data continues to suggest a need for improved education regarding safe pesticide use in the urban setting.

Department of Labor and Industries (L&I)

L&I responds to concerns from workers exposed to pesticides through two divisions: the Washington Industrial Safety and Health Act (WISHA) Services Division, and the Insurance Services Division, Claims Administration Program. In 1997, L&I WISHA Services Division conducted 20 investigations involving pesticide handling and use complaints with 18 resulting in citations being issued against the employer. The Insurance Services Division, Claims Administration Program received 235 claims relating to pesticide illness.

WISHA Services Division

Safety and Health Program
WISHA Services Division staff address safety and health issues in the workplace. WISHA enforcement staff may issue citations that require employers to implement changes in the workplace, assign penalties to serious violations, and perform follow-up inspections to assure compliance.

In 1997, WISHA staff performed 20 pesticide related safety and health investigations in the workplace; 11 in eastern Washington and 9 in western Washington. These investigations occurred in both agricultural and nonagricultural environments. Five involved orchards, five in other farms (berries, potatoes), five at other facilities (grain terminals, landscaping), four occurred in greenhouses or nurseries and one involved a golf course. Twelve were employee or employee representative initiated complaints. Five investigations were the result of referrals from within the agency, or from other state agencies, two were planned inspections identified through the L&I targeting list and one was a fatality investigation (death from heart disease.) Two of these incidents were reported in 1996, investigated in 1997, and were not included in the 1996 data analysis.

Violations were reported in 18 of the 20 investigations. The following violations were most frequently cited: inadequate hazard communication program; inadequate respirator program or fit testing; inadequate eyewash facility; inadequate Personal Protective Equipment (PPE); no accident prevention program; no material safety data sheets; lack of hazardous chemical labeling; no first aid training, kits, or cards; and, inadequate record keeping. The following L&I investigation summaries illustrate common violations associated with occupational pesticide use.

L & I Case #115217390 *L&I investigated a complaint that pesticides were being applied in a greenhouse by an unlicensed applicator, that no personal protective equipment was supplied, and that no training on the hazards of pesticides was given. The unlicensed applicator allegation was referred to WSDA. The employer was fined $2500 for a number of violations including inadequate PPE, no eyewash, inadequate decontamination facilities, no pesticide training, no posting of treated areas, no posting of pesticide safety information, no hazard communication program, no respirator program and improper respirator storage.*

L & I Case #115169450 *L&I investigated a complaint that a groundskeeper at a golf and country club who handled pesticides with inadequate PPE had suffered kidney failure. The investigation of work practices revealed appropriate PPE were provided, except that PVC gloves specified on the fungicide label were not used. The complaint was also investigated by DOH (# 980001 classified as "unlikely"). No association could be made between the exposure and symptoms. Other violations included a lack of eyewash where caustics were handled and no accident prevention program. No penalties were issued.*

L & I Case #115240467 *L&I investigated an internal referral that employees in a cherry orchard entered a block of sprayed trees before the restricted entry interval (REI) had expired and that no hazard communication training was provided. The orchard was fined $1350 for not providing a hazard communication program, failing to provide decontamination facilities and for allowing employees to enter the orchard block before the REI had expired.*

L&I Claims Insurance Services Division, Claims Administration Program

The Insurance Services Division, Claims Administration Program, processes worker claims initiated by on-the-job injuries and illnesses including claims involving pesticides. In addition, these pesticide claims are referred to DOH for further investigation. In 1997, 235 claims were investigated by DOH because of possible health concerns. This compares with 222 investigated by DOH in 1996.

In 1997, 167 (71%) claimants were exposed while working in agriculture and 68 (29%) in a non agricultural setting. DOH classified the 235 claims as definite (19), probable (47), possible (47), unlikely (47), unrelated (39), asymptomatic (6), indirect (1), and unknown (38). DOH determination correlates the likelihood that reported symptoms were causally related to pesticide exposure. The determination does not have a bearing on claim status. For the 113 claims classified as definite, probable or possible, DOH assigned the following severity rating of mild (02) to 89 claims, moderate (03) to 23 claims, and severe (04) to 1 claim. (Refer to severity Appendix C).

Of the 235 claims, 166 (71%) claimants were exposed while working in agriculture and 69 (29%) in non-agriculture. Of the agriculture claims, 129 (78%) claims involved workers in the fruit industry and 47 (36%) of these claims were classified as definite, probable or possible. Twenty-three (14%) claims involved workers in the field crops, of which 11 (48%) claims were classified as definite, probable, or possible.

The following L&I claims and DOH investigation summaries illustrate the type of incident which occurs in the agricultural occupational environment:

Table 27 1996 and 1997 L&I Pesticide Related Claimants by Business Type*

Agricultural	**1996**	**1997**
Fruit	116	129
Field crops	20	23
Vegetables	11	-
Nursery/greenhouse	8	6
Berries	4	-
Christmas trees/Forest	4	2
Other/Unknown	2	6
	165	166
Non Agricultural		
Office workers	6	23
Commercial Pesticide Applicators (Licensed for structural or landscape pest control)	4	5
Property maintenance Staff	7	9
Landscaping, lawn, garden service	6	6
Restaurant/bar	4	3
Wholesale/retail of pesticides (stockers, cashiers)	4	6
Re-packaging for wholesale	8	-
Security Guard	-	3
Other (kennel worker, firefighter, litter control, oyster worker, roofer, airport maintenance)	15	14
	54	69
Total	**222**	**235**

* *Includes all claims referred to DOH that alleged pesticide exposure. Not all were found to be related to pesticides.*

1. ***L&I Claim P738024 and DOH: 970308*** *A pesticide applicator developed eye irritation while spraying a plant growth regulator. The chemical hit his eyes. He was not wearing eye protection. He sought medical treatment one day later. (Classification: Definite, Severity: mild)*

2. ***L&I Claim P665516 and DOH 970023*** *An applicator reported eye irritation, nausea, vomiting, diarrhea, and short of breath after fumigating a potato field. He was not wearing personal protective equipment. He smelled the fumigant while he was applying the pesticide from a tractor. L&I-WISHA indicated the tractor cab was not approved for pesticide application. (Classification: Possible, Severity: moderate)*

3. ***L&I Claim P569931 and DOH 970136*** *Two farmworkers were seen at the emergency room and one was admitted to the hospital for possible organophosphate poisoning. They walked into a field before the REI had expired. Symptoms included short of breath, nausea, dizziness, chest tightness, dry heaves and shaking. (Classification: 2 Probable, Severity: 1 moderate, 1 severe)*

4. ***L&I Claim P360709 and DOH Number: 970054*** *Three members of a crew of five water irrigation technicians developed headaches, nausea and abdominal pain while working next to an orchard. They smelled pesticides in the area where they were working. They sought medical treatment the same day. (Classification: 3 possible, Severity: 3 moderate)*

5. ***L&I Number: P793174 DOH Number: 970339*** *A farmworker developed nausea, headache, cough, shortness of breath, chest pain, eye, nose, and throat irritation while picking apples. He indicated he was breathing a gray fuzzy dust while working. He sought medical treatment seven days later. The physician's diagnosis was sinusitis and probably bronchitis. (Classification: unlikely, Severity: mild)*

6. ***L&I Number: P360765 DOH Number: 970145*** *Two members of a thinning crew developed dizziness, shortness of breath, cough and other symptoms after they smelled pesticides. A pesticide application was being made at a neighboring orchard. One worker sought medical treatment the same day for acute exacerbation of asthma secondary to bronchitis. (Classification: 2 unlikely, Severity: 1 mild, 1 severe)*

Of the 235 claims, 69 were exposed while working in the non agricultural environment and 54 were reported 1996. In 1997, office workers were the non agricultural occupational group with the most (23 or 33%) alleged pesticide exposure claims. Table 28 above lists claims by business type.

The following L&I claims and DOH investigation summaries illustrate the type of incident which occurs in the non agricultural occupational environment:

1. ***L&I Claim: P339088 and DOH: 970251*** *Five individuals became ill on a Monday when they returned to their office, which had been sprayed for roaches on the previous Friday. Symptoms resolved when they left the building. Medical care was obtained on the 4th day of symptoms and all five submitted L&I claims. (Classification: Probable, Severity: mild)*

2. ***L&I Claim P707405 and DOH Number: 970084*** *A loss prevention assistant and three co-workers complained of symptoms after working near a display of insecticides at a retail store. Two people sought medical care. DOH was able to speak with only one person. Her symptoms were consistent with organophosphate exposure. (Classification: probable, Severity: mild)*

3. ***L&I Claim P735260 and DOH Number: 970312*** *A roofer was working on a roof when a bee stung him. He climbed down and obtained a can of aerosol bee/wasp spray. When he sprayed the bee, he accidentally shot some of the pesticide in his mouth and on his neck. (Classification: probable, Severity: mild)*

4. ***L&I Number: P655617DOH Number: 970317*** *A night security guard presented to the emergency room with a history of an itchy rash on both hands and body. There had been an application of Diazanon in the building and he had touched objects such as doorknobs. The physician's diagnosis was an allergic rash. (Classification: unlikely, Severity: mild)*

In 1997, the majority of all initial medical visits were paid, and the claims were determined (Table 29) in accordance with the following definitions:

Medical Only/Non-Compensable Claim: a worker experienced symptoms that he/she believes occurred from exposure on-the-job and seeks medical evaluation. The physician finds the symptoms related to the exposure and there is objective evidence of injury. Therefore, the claim is allowed and medical evaluation and any follow-up medical care/treatment is paid. The employee misses less than three days of work. These lost work days are not reimbursed to the employee.
Time Loss/Compensable Claim: A worker has an allowable claim and misses more than three days of work immediately following an exposure on the job. The worker is paid a portion of salary while unable to work. All related medical costs are covered.
Rejected Claims: Initial diagnostic and evaluation medical costs are covered but the claim is rejected because objective evidence is lacking to relate the symptoms to the workplace

exposure. Many claims are rejected because the symptoms have resolved by the time treatment is obtained; there is no objective evidence of injury; or, exposure cannot be confirmed or documented. A rejected status prevents the worker from reopening a claim based on original symptoms. Initial medical visits are usually paid.

Pending: Additional information is being collected on the claim before a determination can be made.

Kept On Salary: The employer elects to pay the claimant's salary instead of L&I paying time loss payments while the employee is recovering from an injury or illness.

Table 28 Status of Claims Related to Pesticides

Claim Type	1992		1993		1994		1995		1996		1997	
Medical only/ noncompensable	179	78%	223	77%	138	57%	134	55%	97	44%	108	46%
Time loss/compensable	25	11%	41	14%	12	5%	9	4%	8	4%	14	6%
Rejected	23	10%	16	6%	66	27%	98	40%	111	50%	101	43%
Pending	2	1%	10	3%	25	10%	3	1%	2	1%	12	5%
Kept on salary	—	—	—	—	—	—	1	—	1	—	—	—
Unknown	—	—	—	—	—	—	—	—	3	1%	—	—
Total	**229**		**290**		**241**		**245**		**222**		**235**	

As of April 1999, $376,891 was paid out on all 1997 pesticide claims (including rejected claims). Of that amount, $246,795 was paid out on pesticide claims in agriculture.

L&I Observations

In 1998, L& I conducted a review of claims data since1994 to determine the reasons for an increase in rejected pesticide claims. (Refer to page 2)

L& I enforcement of the Worker Protection Standard

In 1996, a Memorandum of Understanding (MOU) was signed between the Departments of Agriculture, Labor & Industries and Health related to the Agriculture Pesticide Worker Protection Standard. The Worker Protection Standard was promulgated by the federal EPA in 1992 and adopted in 1996 by both the Departments of Agriculture and Labor & Industries with a few additional requirements. This MOU designated L & I as the "lead agency" in investigation of worker exposure to pesticides, with the Departments of Agriculture and Health referring worker exposure complaints to L & I. The Worker Protection Standard is incorporated into L&I's Agriculture Standard, WAC 296-307.

Although the majority of violations reported in 1997 related to hazard communication and respirator programs, violations specific to the Worker Protection Standard were cited several times. It is expected that more of these violations will be cited in the future.

Washington Poison Center

In 1997, the Washington Poison Center (WPC) received 134,213 calls. Of these, 3,227 were pesticide related calls and account for two percent of total calls received statewide by WPC (Table 29). No significant changes were observed from previous years.

In Washington State pesticide poisonings are a reportable condition (WAC 246-100-217), and health care providers can report to DOH directly or through the WPC. The WPC reports all calls regarding pesticides that it receives from health care providers as well as calls from the public if they have visited their health care provider, or if the case is obviously caused by the pesticide.

Table 29 WPC Comparison with Prior Years

Pesticide	1990	1991	1992	1993	1994	1995	1996	1997
Fungicide	86	141	124	117	96	104	120	88
Herbicide	650	608	637	573	512	531	441	482
Insecticide	3,633	3,090	3,460	3,158	2,040	2,173	1,992	2,103
Moth Repellent	180	187	158	120	68	89	66	77
Rodenticide	682	655	664	676	473	478	473	477
Total	**5,231**	**4,681**	**5,043**	**4,644**	**3,189**	**3,375**	**3092**	**3,227**
% of Total Calls to WPC	**4.1%**	**3.7%**	**3.9%**	**3.09%**	**2%**	**2%**	**2%**	**2%**

In 1997, 156 reports from WPC were investigated by DOH because of clinical signs and symptoms of pesticide illness. DOH classified these cases: 16 definite, 40 probable, 39 possible, 16 unlikely, 9 unrelated, 21 unknown, and 15 exposure confirmed but asymptomatic. As in previous years, the majority (92%) of pesticide related calls to WPC involved accidental exposure. Insecticides (Table 30) continued to be the type of pesticide most frequently involved in calls to WPC (62%).

Table 30 1997 WPC Calls by Pesticide Type and Age

Pesticide Type	Less than 6 years old	6-19 years old	>19 years old	Total Human Exposure Calls
Fungicides	20	9	59	**88**
Herbicides	118	70	294	**482**
Insecticides	827	299	977	**2103**
Moth Repellents	24	9	44	**77**
Rodenticides	373	31	73	**477**
Total	**1362**	**418**	**1447**	**3,227**

Table 31 lists the types of insecticides involved in calls to WPC in 1997. The distribution is similar to prior years. Note that an incident may frequently involve more than one type of pesticide in the product.

Of the 2,103 insecticide exposures, 334 were managed in a health care facility with 5 considered to have caused moderate reactions. Seventy were considered intentional exposures. There were no deaths.

Forty-two percent (1,362) of the calls to WPC involved children less than six years of age. Table 31 illustrates WPC calls by pesticide type for the different age groups. This distribution is consistent with prior years.

Table 31 1997 WPC Type of Insecticide involved in Poisoning Call

Insecticides Generic Code/description	Number of Calls
Arsenic	5
Borates/Boric Acid	32
Carbamate Only	91
Carbamate with other pesticides	15
Chlorinated Hydrocarbon only	130
Chlorinated Hydrocarbon with other	3
Metaldehyde	80
Organophosphate only	395
Organophosphate with carbamate	17
Organophosphate with chlorinated hydrocarbons	4
Organophosphate with other pesticide	32
Organophosphate/carbamate/chlorinated hydrocarbons	1
Piperonyl butoxide only	3
Piperonyl butoxide/pyrethrins	306
Pyrethrins only	267
Repellants (insect)	154
Rotenone	5
Veterinary insecticide	277
Other	89
Unknown	197
Total	**2,103**